

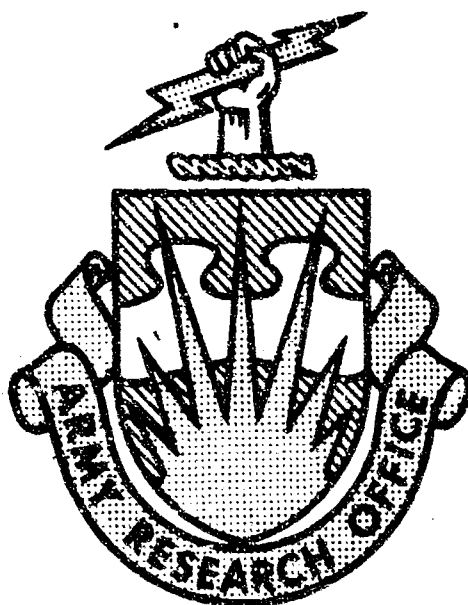
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Report Number 2

The Cerebral Localization of Language Functions

FINAL REPORT



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By: Augusto Gentil Baptista

April 1967

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U. S. Army Element

Defense Research Office, Latin America

Rio de Janeiro, Brazil

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THE CEREBRAL LOCALIZATION OF LANGUAGE FUNCTIONS

FINAL REPORT

by

Augusto Gentil Baptista

APRIL 1967

U. S. Army Element
Defense Research Office for Latin America
Rio de Janeiro, Brazil

U. S. Department of the Army Project Number 2N01450131D

Núcleo de Medicina Experimental
Hospital Prof. Edgard Santos
Universidade Federal da Bahia
Salvador, Bahia, Brazil

A reformulation of last year's report Tables I & II confirms previous findings. The total number of patients was increased to 102.

TABLE I

| | <u>S/encephalic lesion</u> | | <u>G/encephalic lesion</u> | | |
|--------------------------|----------------------------|------------|----------------------------|------------|----------|
| | Evidence: | | Evidence: | | |
| <u>Cultural level:</u> | Clinical | Pathologic | Clinical | Pathologic | Total |
| Completely Illiterate | 28 | 5 | 9 | 1 | 43 |
| Barely alphabet. | 17 (63%) | 7 | 2 (69%) | 0 | 26 (68%) |
| Schooling, up to | | | | | |
| 1st.grade | 2 | 0 | 1 | 0 | 3 |
| 2nd.grade | 3 | 0 | 0 | 0 | 9 |
| 3rd.grade | 4 | 0 | 0 | 1 | 5 |
| 4th.grade | 3 | 0 | 0 | 0 | 3 |
| 5th.grade | 7 | 1 | 2 | 0 | 10 |
| Above | 1 (37%) | 0 | 2 (31%) | 0 | 3 (32%) |
| Total | 71 | 13 | 16 | 2 | 102 |

TABLE II

| <u>Cultural Level</u> | Cases s/encephalic lesion, by: | | | |
|-----------------------|--------------------------------|-----------|---------------------|----------|
| | Clinical evidence | | Pathologic evidence | |
| | <u>Language:</u> | | <u>Language:</u> | |
| | normal | abnormal | normal | abnormal |
| Completely illiterate | 2 | 26 | 1 | 4 |
| Barely alphabetized | 8 (34%) | 9 (83%) | 2 | 5 |
| Schooling, up to | | | | |
| 1st. grade | 2 | 0 | 0 | 0 |
| 2nd. grade | 6 | 3 | 0 | 0 |
| 3rd. grade | 3 | 1 | 0 | 0 |
| 4th. grade | 3 | 0 | 0 | 0 |
| 5th. grade | 5 | 2 | 1 | 0 |
| Above | 0 (66%) | 1 (17%) | 0 | 0 |
| | <u>29</u> | <u>42</u> | <u>4</u> | <u>9</u> |

Of these, only 18 (18%) had clinical or pathologic evidence of encephalic lesion, while as much as 66 patients produced abnormal language test results. 51 (61%) out of the 84 patients without brain lesion committed mistakes which would be of pathological meaning if measured by current standards. Sixty-eight per cent of the patients were grossly illiterate. Forty-four (79%) out of 56 illiterate patients showed abnormalities in the language test results, while only 7 (26%) out of 27 patients with some scholarship showed such abnormalities.

Illiteracy, then, leads to poor language, and probably is related to the low I.Q. evident in these patients. These findings lead one to suspect that oligophrenia may be widely distributed among low cultural and socio-economic level populations.

As regards the number of mistakes committed in each individual test, the same trend noted in the previous report was maintained.

In 2 patients showing abnormal language, brain lesions were demonstrated on post-mortem examination. One of these had been examined before and after development of clinical manifestations of the lesion.

The findings are described below.

CASE REPORT

A 46-year-old, illiterate, right-handed, negro male, suffering from Chagas' disease and atrial fibrillation, had his language examined on June 1965. No neurological abnormalities were found on both history and physical examination. On October 5, he was admitted to the ward, due to right hemiplegia of sudden onset 12 days previously. Language was reexamined on October 6 to 9. On October 20, 1965, the patient died suddenly. Massive pulmonary embolism was demonstrated as the cause of death, at autopsy.

Language test results obtained were as follows.

| <u>Before hemiplegia</u> | <u>After hemiplegia</u> |
|------------------------------------------------------------------------|-----------------------------------------------------|
| SECTION A | |
| 1 & 2: No significant mistakes | No change |
| SECTION B | |
| 1 & 2: Not done, due to illiteracy | No change |
| 3: a & b: No mistakes | No change |
| SECTION C | |
| 1. Suppression of 6 words on period no. 7 | No change |
| 2: 1) Wrong - "I don't know" (correct answer would be "no, he didn't") | Wrong - "he was a great poet" |
| 2) Right - "yes, he did" | Wrong - "I mean to say: to verify" |
| 3) Right - "no, they didn't" | Wrong - "was he the one who discovered Brazil?" |
| 4) Right - "yes, they came" | Right - "yes, they came" |
| 5) Right - "no, they didn't" | Wrong - "it was an argument among the great poets", |
| 6) Wrong - "yes, he did" | Wrong - "under disguise" |
| 3: Right | Right |
| 4: Right | Right |
| 5: Right | Totally wrong |

BeforeAfter

SECTION D

1. a, b & c: No mistakes
 2. a: No mistakes
 b: No mistakes
 3. a: No mistakes
 b: No mistakes
 c: No mistakes

No change
 No change
 Pictures 5 & 6 - repeated "necktie"
 Pictures 9 & 10 - repeated "pider"
 Only one correct answer: no.3
 Entirely unable to accomplish
 the test: insisted on
 indiscriminately pointing to the
 whole group of crayons
 To question no.1 answered -
 "cloud"
 On question no.4 repeated -"red"

SECTION E

1. a: Distortion of letters b & a
 b: Direct series - erred on
 nos.9 & 10
 Reverse series - erred from
 no.4
 2. a to f: Not done, due to ill-
 literacy
 3. a: Correct answers to 1, 4,
 6 & 9
 b & c: Not done, due to ill-
 literacy
 d: Correct answers to 1, 2 & 3
 4. a & b: Slight distortion
 (see Fig.1)

Entirely unable to accomplish
 the test
 Direct series - no change
 Reverse series - erred from no.2
 No change
 Only one correct answer: no.4
 No change
 Totally wrong
 Extreme distortion (see Fig.1)

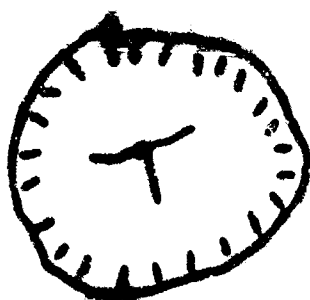
SECTION F

1. a & b: Not done, due to ill-
 literacy
 2. a: 1)Right
 2)Right
 3)Wrong - "I don't know"
 4)Right
 5)Wrong - "courage to do"

No change
 Wrong - "common"
 Wrong - repeated "robin"
 Wrong - "it is a hero"
 Wrong - "bird"
 Wrong - "resisting"

EXERCISE 1

Before



After



Final

Before

- 6)Wrong - "to repair old things; to become new again"
- b: 1)Wrong - "I don't know"
- 2)Wrong - "I don't know; I have heard this before, but I don't understand")
- 3)Right

After

- Wrong - "may be it is useful"
- Wrong - "nothing"
- Wrong - "it is a pitfall"
- Wrong - "he who walks exists, works"

SECTION G

- 1: Right
- 2: Right
3. a & b: Right

- Totally wrong
- Right, 1 & 2
- Wrong, 3 to 5
- Unable to accomplish any of the tests

SECTION H

1. a: Right, 1 to 6
Wrong, 7
- b: Right, 3 to 6
Wrong, 1 & 2
- c: Right
2. a: Moderate distortion (see Fig.2)
- b: Slight distortion (see Fig.2)

- Totally wrong
- Only one correct answer: no.6
- Totally wrong
- Extreme distortion (see Fig.2)
- Marked distortion, 1 to 3 (see Fig.2)
- Unable to reproduce 4 to 7

SECTION I

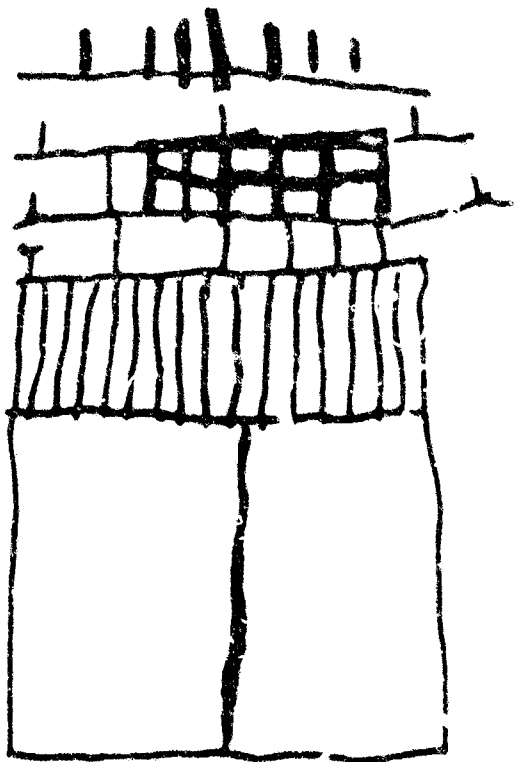
1. a: Right
- b: Right
2. Right

- Totally wrong
- Right, 1 to 3
- Wrong, 4 to 8
- Only one correct answer: no.1

SECTION J

Although illiterate, the patient was able to cut 36 out of 56 letters a (missed 20)

Entirely unable to accomplish the test



Before

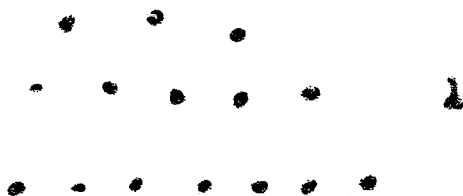
SECTION E-2-a



After

SECTION E-2-b

Before



After



2



1



Fig. 2

In summary, the following was observed after the development of a large cerebral lesion.

Perseveration

Lowered comprehension of spoken language

Possible chromatoagnosia

Apraxia, including constructional apraxia

Acalculia

Loss of space perception

Somatoagnosia

Inattention

Perservation of memory, as well as of the capacity of
sounds identification and expression

Extensive brain softening was found at autopsy, grossly corresponding to the area of distribution of the left middle cerebral artery, as demonstrated by the enclosed diagrams (Fig. 3 to 5).

Although obviously not conclusive in relation to the localization of language functions on the forebrain, the case above presented corroborates some of the existing knowledge and shows a research line to be followed for the clarification of the seat of such functions.

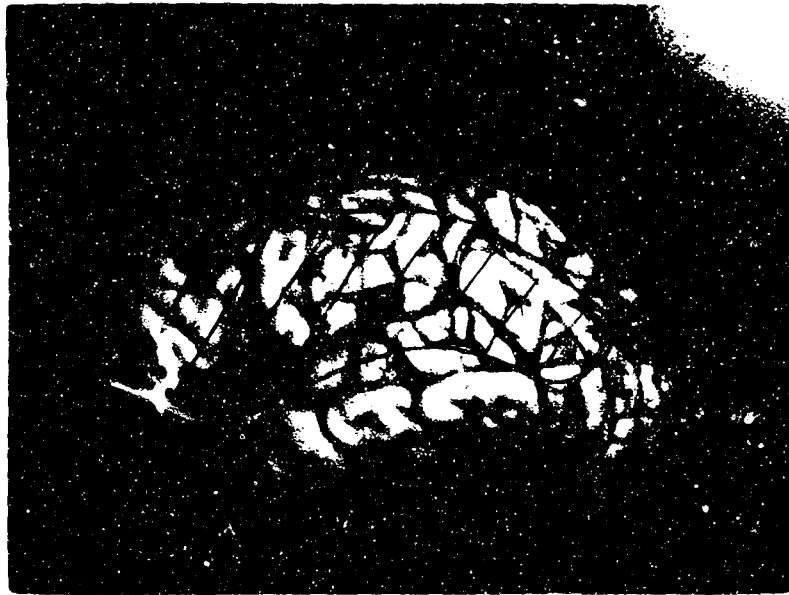


Fig.3



Fig.4



Fig.5

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Not located

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| 13. ABSTRACT Continuation of a long term study to correlate focal brain lesions resulting from Chagas disease with changes in speech functions. Patient group expanded to 102. Two died during period and were autopsied. Lesion in one gross with extensive softening in area of left cerebral artery. Insufficient data at this stage to discuss correlations. | | |

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| KEY WORDS | LINK A | | LINK B | | LINK C | |
|--------------------------------------------------------------------------------------------------------|--------|----|--------|----|--------|----|
| | ROLE | WT | ROLE | WT | ROLE | WT |
| <p>Chagas disease</p> <p>Physiology</p> <p>Neurology</p> <p>Functional centers</p> <p>Brain lesion</p> | | | | | | |

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